

TESTIMONY OF
BENJAMIN H. GRUMBLES
ASSISTANT ADMINISTRATOR
FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE
UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENVIRONMENT AND HAZARDOUS MATERIALS

July 24, 2008

Thank you, Chairman Green and Members of the Subcommittee. I am Benjamin H. Grumbles, Assistant Administrator for Water at the U. S. Environmental Protection Agency, and I appreciate the opportunity to discuss the Agency's important work on carbon dioxide (CO₂) storage and our new regulatory proposal under the Safe Drinking Water Act (SDWA) on geologic sequestration. This first-ever rule on geological sequestration (GS) will provide a national framework for regulatory consistency and environmental safety, as well as necessary flexibility based on geological settings.

This Administration is committed to taking timely and aggressive actions to confront the serious challenge of global climate change. By harnessing the power of advanced climate change mitigation technologies such as carbon capture and geologic sequestration, we are entering a new age of clean energy – where we can be both good stewards of the Earth, and good stewards of the American economy.

Carbon dioxide storage can be achieved through several approaches. Before discussing EPA's proposed rule for geologic sequestration of CO₂, I wanted to briefly

mention two other approaches that hold promise, but which are largely outside the scope of the proposed geologic sequestration rulemaking.

The first type of long term storage is terrestrial sequestration, which relies on vegetation to remove CO₂ from the atmosphere. Carbon dioxide captured by terrestrial sequestration is isolated in biomass and soils. This type of sequestration has helped to offset CO₂ in 2006 as a result of improved soil and forestry maintenance.

In addition to the carbon sequestration benefits, terrestrial sequestration activities can have significant environmental co-benefits important to protecting our Nation's resources, including reduced soil erosion, improved water quality, improvements to wildlife habitat and biodiversity, and reduced flooding.

Another type of sequestration is sub-seabed sequestration. Sub-seabed sequestration is the process of taking CO₂ from industrial and energy- related sources, transporting it offshore, and isolating it in offshore geologic formations. The proposed rule will apply under the SDWA to sub-seabed sequestration beneath ocean waters within a State's territorial boundaries. In addition, the Senate is currently considering U.S. ratification of the 1996 Protocol to the London Convention on dumping of wastes, a treaty which explicitly regulates sequestration of captured CO₂ in sub-seabed geological formations. On June 20, 2008, the Administration sent proposed legislation to Congress that would implement that provision under the Marine Protection, Research and Sanctuaries Act (MPRSA).

The focus of our rulemaking and this hearing, however, is on geologic sequestration associated with Carbon Capture and Storage (CCS). This promising technology provides an innovative solution for reducing emissions of (CO₂) to the atmosphere, while safeguarding our country's underground sources of drinking water.

The Intergovernmental Panel on Climate Change has estimated that the process of capturing, transporting, and storing CO₂ through CCS can potentially reduce domestic CO₂ emissions to the atmosphere from 15% to 55% over the next century. Storage is carried out through geologic sequestration, which consists of injecting carbon dioxide that has been captured from an industrial or energy-related source into deep subsurface rock formations for long-term storage. It is not a silver bullet for our climate change challenges, but CCS could help to reduce emissions while scientists around the world work to identify cleaner technologies to power our energy needs in the future.

EPA's Strategy on Water and Climate Change

Consistent with our desire to mitigate emissions and adapt to climate change, EPA's National Water Program has developed a draft strategy to respond to specific potential impacts on water programs, define goals and objectives for responding to climate change impacts, and recommend a comprehensive package of specific response actions. As you might expect, geologic sequestration technologies and environmental safeguards under the Safe Drinking Water Act play a key role in the strategy. In addition to regulations developed under the SDWA, the Office of Water has been involved in other efforts to manage climate change.

The draft strategy contains 46 specific actions EPA's Water Program will take to respond appropriately to climate change in topic areas including adaptation, mitigation, education, and research within our authorities in the SDWA and Clean Water Act. After extensive internal EPA review and coordination with other agencies, the Office of Water released the draft Strategy this March. Since then, we have received comments from the public and met with scientists, regulators, and policy makers and plan to finalize the

document this fall. Along the way, we will continue to take proactive and practical steps to address climate change, for areas related to geologic sequestration outside of the SDWA authorities.

EPA'S Proposed Regulations for Geological Sequestration

One of the primary actions identified to help mitigate the effects of climate change is geologic sequestration (GS), which is regulated under the Safe Drinking Water Act's Underground Injection Control (UIC) program. Over the past several years EPA has coordinated with the U.S. Department of Energy (DOE) to support carbon dioxide storage as a technology. We released guidance in March 2007 to facilitate permitting of DOE pilot projects for geologic sequestration. Last fall Administrator Johnson announced EPA's intent to develop regulations and I am pleased to report that the Administrator signed the proposed regulations last Tuesday, on July 15th. These proposed regulations will help to create a consistent, national framework for the large-scale injection of carbon dioxide underground, while protecting our vital underground water resources.

The UIC program is focused on protecting public health by preventing injection wells from contaminating underground sources of drinking water. EPA's proposed regulations build on more than 35 years of experience in the UIC program of safely injecting fluids, either liquid, gas or slurry, including CO₂, into the subsurface. Annually, billions of gallons of fluids are injected underground through wells authorized under State and Federal UIC Programs. This includes approximately 35 million tons of carbon dioxide that are injected for the purposes of enhancing oil and gas recovery.

Currently, wells used to inject CO₂ can be permitted as UIC Class I industrial wells, as Class II oil and gas wells (if used for enhanced recovery of oil or gas) or as Class V experimental wells (under our March 2007 guidance). However, because CO₂ has unique physical characteristics, we believe it is important to make adjustments to our existing UIC program that will respond to these characteristics. The buoyancy of CO₂, its potential corrosivity when in water, the potential presence of impurities in captured CO₂, its mobility within subsurface formations, and the large injection volumes anticipated at full scale deployment, have all been considered in requirements tailored to the new practice of injecting CO₂ for long-term storage.

EPA's proposal would create a new well type – a Class VI UIC well. Our regulations would require that geologic sequestration wells are appropriately located, constructed, tested, and monitored. Siting requirements would include provisions for ensuring that the site is thoroughly evaluated to ensure that CO₂ will not migrate to the surface. Construction requirements would include provisions that wells be constructed with corrosion resistant materials to prevent the well from corroding over time. The proposal includes provisions for periodic review of the area around the injection well to allow for adjustments as the fluid moves underground, and incorporation of monitoring and operational data to verify that the CO₂ is moving as predicted within the subsurface to protect underground sources of drinking water. We have also included proposed requirements for financial responsibility to assure that funds will be available for well plugging, site care, closure, and emergency and remedial response. We believe we have developed a framework that will ensure safe injection in the present and safe storage in the future.

EPA plans to publish a final rule in late 2010, or possibly 2011, depending on the data we receive. In developing a proposal to meet the fast pace of developing CCS technology, EPA will take into account any new data and DOE demonstration project outcomes. The Agency is using an adaptive management approach that will allow us to collect information and use data from the DOE demonstrations and other early projects to inform the final regulation and any subsequent revisions, if necessary.

UIC Authority to Require Air Monitoring at the Surface

In issuing regulations for permitting under the UIC program, we have authority under the Safe Drinking Water Act to require monitoring for injected CO₂ that may be released back into the atmosphere. Under Section 1421 of the law, EPA is mandated to protect underground sources of drinking water from endangerment by underground injection. Under this authority, EPA may require an owner or operator who is injecting CO₂ to determine if an underground source of drinking water is endangered, including surface air monitoring. This authority can extend to the post-injection period of a well as long as an underground source of drinking water has the potential of becoming endangered by the injected CO₂.

While subsurface monitoring forms the primary basis of protecting underground sources of drinking water, near-surface and surface monitoring could be a last line of monitoring. Under the proposed regulations the Director has the discretion to require surface air monitoring/soil gas monitoring in the area of review. Near-surface and surface monitoring could help to determine if leakage to an underground source of drinking water has occurred and could also help to identify the general location of the leak.

Financial Responsibilities Related to Well Operation

Financial responsibility for well operation has been a part of UIC requirements for deep wells since inception of the program. The Safe Drinking Water Act does not have explicit provisions for financial responsibility, as is included under the Resource Conservation and Recovery Act. However, EPA uses the general authorities provided under the law to prevent endangerment of underground sources of drinking water, including by setting standards for financial responsibility to prevent endangerment of underground sources of drinking water from improper plugging, remediation, and management of wells after injection.

EPA is proposing to adapt existing financial responsibility requirements for deep Industrial Class I UIC wells to the new Class VI geologic sequestration wells to ensure that appropriate well closure and post-injection site closure takes place. The requirements for wells would include that owners and operators demonstrate and maintain financial responsibility and resources for 1) corrective action so that wells within the area of review do not serve as conduits for the movement of fluids into underground sources of drinking water, 2) injection well plugging, and 3) emergency and remedial response. These requirements are already in place for UIC deep wells. In addition to these requirements, we are proposing adding a requirement that owners and operators develop a plan and demonstrate and maintain financial responsibility and resources for post-injection site closure care before closing geologic sequestration sites.

SDWA authority does not currently extend to financial responsibility for activities unrelated to protection of underground sources of drinking water, i.e., coverage of risks to air, ecosystems, or public health unrelated to underground sources of drinking water

endangerment. It also does not authorize transfer of owner or operator financial responsibility to other entities, or creation of a third party financial mechanism where EPA is the trustee. EPA realizes there are long timeframes anticipated for geologic sequestration and these long timeframes have prompted interest in discussion of alternative approaches for providing stewardship after site closure. As a result, the Agency has prepared a supplemental document on approaches to geologic sequestration site stewardship to provide information about stewardship after site closure as a means of continuing this discussion. This document is available in the docket for the rule-making.

Coordination and Collaboration

Within EPA, the Office of Water and Office of Air and Radiation have worked together on all activities related to geologic sequestration in order to conduct technical and cost analyses, develop risk management strategies, collaborate with key stakeholders, and clarify the relationships among various statutes and EPA regulations. Our Office of Research and Development has also been involved in providing technical assistance and recently initiated a research program to study the potential effects of carbon sequestration activities on human health and the environment.

EPA is working closely with DOE to leverage existing efforts and technical expertise. EPA and DOE are coordinating with Lawrence Berkeley National Laboratory to answer key technical questions regarding impacts on groundwater and underground formations. The Agency is also working closely with researchers at other labs including the Pacific Northwest National Laboratory and Lawrence Livermore National Laboratory, and is monitoring international projects such as Sleipner in Norway, In Salah in Algeria, Weyburn in Canada, and Otway in Australia, to help inform the regulatory framework.

DOE is conducting demonstration projects to gather data on the effectiveness and safety of GS. DOE is implementing many small and large-scale field tests of carbon dioxide injection throughout the country in a variety of geologic settings. In addition to facilitating initiation of pilot projects, another goal of the technical permitting guidance EPA issued in March of 2007 is to promote the exchange of information to support the development of a long-term geologic sequestration management strategy.

EPA will continue to engage with the Department of Transportation, Department of Interior, as well as other federal agencies, States, and Tribes during the rulemaking process. EPA has worked closely with key organizations such as the Groundwater Protection Council (GWPC) and the Interstate Oil and Gas Compact Commission (IOGCC), which represent States that implement UIC programs, and we will continue to do so throughout the regulatory process. For example, the Agency has reviewed the IOGCC report entitled “Storage of Carbon Dioxide in Geologic Structures: A Legal and Regulatory Guide for States and Provinces.” The document’s discussion of issues such as permitting and property rights may be very useful as we finalize regulations.

In addition, the Agency has worked directly with states, including by inviting

them to participate on EPA's rulemaking workgroup as implementing partners. Four states participated in EPA's workgroup, representing Alabama, Ohio, Texas, and Arkansas. I want to express my appreciation to Larry Bengal, who will be on the next panel, for participating on EPA's workgroup, and providing the Agency with useful information in the development of the proposal.

Additionally, we are prepared to coordinate with the United States Geological Survey and the DOE through the Energy Independence and Security Act of 2007 to conduct an assessment of the geographical extent of all potential sequestration formations, the potential capacities and injectivities of these formations, and an estimate of the potential volumes of oil and gas recoverable from such efforts.

Over the past several years, the Agency has been holding workshops, attending conferences and meeting with public and private stakeholders including industry experts, legal experts, technical experts, and environmental advocates to gather useful input. We appreciate the participation of these stakeholders, and want to thank panel member Scott Anderson for attending our meetings and serving on panels at our technical and public workshops. Our past experience gives us confidence we can work closely with key stakeholders and experts to develop well-designed regulatory approaches to preserve our nation's underground sources of drinking water.

This past December, EPA held a meeting that focused on the potential regulatory framework for geologic sequestration. The two day workshop, held in Washington, DC, was attended by more than 200 stakeholders representing government, research institutions, industry, public interest groups, law firms, and the general public. A second meeting was held in February 2008 in Crystal City, Virginia where EPA provided a comprehensive review of how current UIC Program elements could be tailored for the

purposes of CO₂ injection for geologic sequestration. Furthermore, over the past year EPA has held technical workshops in New Orleans, Washington DC and Albuquerque with researchers and stakeholders to discuss technical considerations for establishing a geologic sequestration framework.

EPA plans another series of meetings to discuss the proposed rulemaking during the comment period, and will publish details about the upcoming meetings in the Federal Register next month.

Conclusion

Mr. Chairman, EPA is committed to continuing the important work underway to realize the significant potential of carbon dioxide capture and geologic sequestration.

We also recognize we are developing regulations even as CCS technology matures, and as vitally necessary pilot projects come online. Emerging information from experimental pilot projects, and from ongoing scientific research, will be critical to design the best framework for managing these wells and ensuring our many environmental safeguards and public health protections are effective. We will continue to work closely with other federal agencies and encourage participation of states, associations, public interest groups, industry, and other stakeholders to gather feedback on our newly proposed rule as carbon capture and storage technologies advance.

Thank you, Mr. Chairman and Members of the Subcommittee for this opportunity to describe EPA's important work on geologic sequestration. I would be happy to answer any questions you may have.